

# USING THE RASCH MODEL TO ANALYZE VALIDITY AND RELIABILITY OF ITEMS OF ELECTRICAL FOUR TIER TEST (EFOTIT)

Rahmawati Rahmawati<sup>1\*</sup>, Edy Kurniawan<sup>2</sup>, A. Muafiah Nur<sup>3</sup>, Dewi Hikmah : Marisda<sup>4</sup>

<sup>1,2,4</sup>Program Studi Pendidikan Fisika, Fakultas Keguruan dan Ilmu Pendidikan,  
Universitas Muhammadiyah Makassar, Jl. Sultan Alauddin No. 259, Makassar 90222,  
Indonesia

Program Studi PGSD, Fakultas Keguruan dan Ilmu Pendidikan, Universitas  
Muhammadiyah Makassar, Jl. Sultan Alauddin No. 259, Makassar 90222, Indonesia

E-mail: [\\*rahmawatisyam@unismuh.ac.id](mailto:*rahmawatisyam@unismuh.ac.id)

**Abstract.** This study aims to analyze the reliability and validity of electrical four-tier test (EFoTiT) items using the Rasch model aided by the Winsteps version 3.68.2 program application. The EFoTiT aims to explore prospective physics teachers' misconception. The EFoTiT consists of 20 items about material electric current, resistance, resistivity, Ohm's law, electric voltage, energy and electrical conductivity, resistors in series, parallel, and mixed circuits, Kirchhoff's law, and RC charging and discharging capacitor circuits. The sample of this study is prospective physics teacher students who had passed basic physics courses. The results showed that the EFoTiT has a value of the Alpha Cronbach reliability with a good and acceptable category (0.76). The value of person reliability is in the sufficient category (0.76). Meanwhile, the personnel separation coefficient of 1.77 which indicates the response of respondents is quite good and consistent. Analysis of the observational aspects of item fit shows there is no items that need to be changed or removed. The result of person fit analysis shows there are seventeen out of sixty-three respondents who experienced unusual response patterns. A review of the map variable observations shows the distribution of respondents' abilities and the items are proportional. Analysis of the unidimensional aspects shows the value of "raw variance explained by measure" is in the acceptable category. Based on the results of the analysis on a number of aspects, it can be concluded that the EFoTiT test is reliable and valid to measure the students' concepts position.